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preliminary transportation study

CUMBERLAND GAP

NATIONAL HISTORICAL PARK / KENTUCKY

PRELIMINARY TRANSPORTATION STUDY
CUMBERLAND GAP NATIONAL HISTORICAL PARK
KENTUCKY

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
DENVER SERVICE CENTER
PROFESSIONAL SUPPORT DIVISION
CONCESSIONS BRANCH

MAY 1989

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I. PURPOSE AND BACKGROUND

A request was made by the Southeast Regional Office for a feasibility study of a possible concessioner-operated shuttle system at Cumberland Gap National Historical Park. The shuttle would link the visitor center with the Pinnacle and Hensley Settlement.

The Master Plan, completed in 1979, calls for an interpretive shuttle to deliver 104 visitors a day to the Hensley Settlement. It also states that the same shuttle could be used to take visitors to the Pinnacle. The road to the Pinnacle cannot accommodate vehicles longer than 20 feet due to the sharp switchbacks.

There are two roads to the Hensley Settlement (Brownies Creek Road and Shillalah Creek Road); however, it is unsafe for most visitors to attempt the drive to the Settlement.

The Hensley and Gibbons families, related through marriage, settled on Brush Mountain (now known as Hensley Settlement) in 1903. On this remote mountain top they became totally self-sufficient. They built their homes and outbuildings from logs, mud and shake shingles. Using only hand tools and mules, they cleared the land and became farmers. There were no roads, electricity or other conveniences. The Settlement was occupied until 1951 when Sherman, the last of the Hensleys, left the mountain.

The park exerts every effort to maintain this isolated Appalachian community for the education and enjoyment of its visitors. The most popular method of reaching the Settlement remains by foot, much the same as it was when the Hensleys and Gibbons lived there. Unfortunately, this eliminates those visitors that are handicapped or not physically fit from enjoying this rare attraction. The only way this group can enjoy Hensley Settlement is to be driven to it.

Many of the original buildings remain and several could make pleasant overnight facilities for individuals that would like to experience a taste of Appalachia past.

METHODOLOGY

A member of the Denver Service Center Concessions Branch visited Cumberland Gap during the first week of May 1989. Local business leaders and park personnel were interviewed. Hensley Settlement and the Pinnacle were visited, as well as other areas of the park and nearby communities.

II. ANALYSIS

PROBLEMS REVIEWED

Hensley Settlement is in a remote section of the park. There are two roads that offer access to the Settlement, Brownies Creek Road and Shillalah Creek Road. Brownies Creek Road is maintained by the county and is in very poor condition. Shillalah Creek Road is a one lane, steep graveled road, maintained by the park. Both roads require a great deal of driving skill to arrive safely at or return from the Settlement.

Visitor access to Hensley Settlement has been by hiking via the 19-mile Shillalah Creek Road; on horseback using the 15-mile Brownie Creek Road; or for a few hearty people, driving on the Shillalah Creek Road. There are also two trails that offer access to the Settlement. They are the Ridge Trail and the Chadwell Trail. The most popular is the Chadwell Trail which is only 3 1/2 miles to the Settlement from its trailhead in Caylor, Virginia. Except for driving, this effectively eliminates the physically unfit and the handicapped from visiting the Settlement. If a shuttle is adopted, wheelchair bound visitors would find it nearly impossible to visit the buildings at the settlement since there are no paths for wheelchairs.

The road to the Pinnacle is two lanes and paved but has some sharp switchbacks which make it impossible to use vehicles longer than 20 feet. The Pinnacle offers parking, picnic facilities and the best vistas in the park. Consideration of a shuttle to the Pinnacle may not be practical since most 25-passenger minibuses are more than 20 feet long. Smaller vans could be used as they are less than 20 feet in length, but these would not be practical for use to the Settlement and therefore cost ineffective. Unless there is a scarcity of parking at the Pinnacle, there appears to be no reason for a shuttle since visitors have no difficulty reaching the top in their automobiles. On that basis, it is suggested that no more consideration be given to a Pinnacle shuttle.

The Eastern Team of the Denver Service Center is currently conducting a study which involves several parking lots within Cumberland Gap. It was their opinion that transportation for visitors using these lots to other sites in the park might tie in with the shuttle system. Until their study is completed or at least firm alternatives are established, this office cannot comment on whether these additional services would be compatible with the proposed shuttle. They may, however, offer enough additional sales to make the run to the Pinnacle more attractive.

VISITATION

The average visitation to Cumberland Gap for the months of May through October during 1987 and 1988 is:

May	82,994
June	104,782
July	102,339
August	80,745
September	65,623
October	105,616
TOTAL	542,099

Hiking to the Settlement seemed to be as important as the experience at the Settlement itself. How many of the nonhikers would wish to see the Settlement at the cost of a shuttle ride is difficult to estimate. Because of the sizable investment required by a concessioner, a conservative figure of 10 percent of total visitation was used in the preparation of this report. This figure of 54,210 projected riders was then further reduced to compensate for inclement weather.

VEHICLES NEEDED

Buses of the type necessary to travel the road to the Hensley Settlement would be expensive, ranging in price from $75,000 to $110,000 and perhaps more (see appendix 2).

The projection for percentages of bus capacities for Monday through Friday is 70 percent and 100 percent for Saturday and Sunday. Each bus would make three trips per day. Buses with a capacity of 25 seats would then accommodate 75 riders per day on Saturday and Sunday and 53 riders Monday through Friday. To accommodate the anticipated number of passengers, it is suggested that five vehicles be purchased initially.

FINANCIAL PROJECTIONS

Included in this report are two pro formas (appendix 1) which indicate a shuttle to the Settlement is infeasible. Both project losses before depreciation, interest and tax expenses.

At first glance, the pro formas suggest the infeasibility could be corrected by increasing the number of vehicles. However, except for Saturday and Sunday when the buses are projected to operate at full capacity, they run at only 70 percent. Operational costs are assessed on a basis of $4 per mile, and sales per mile must equal costs plus a profit. Unless the number of riders increases or fares are increased or a combination of the two, the shuttle will not be a feasible operation.

On pro forma 1, the shortfall of passengers amounts to 14,700 per season or 89 per day, based on fares of $7.50 for adults, $3.50 for children, and $5 for senior citizens. The total capacity of the five buses for a 166-day season (184 days minus 10 percent or 18 days for inclement weather) is 62,250. We have projected 48,790 riders on the pro formas based on present visitation. The additional 14,700 would bring the total number of riders to 63,490, or 1,240 over capacity.

To accommodate 89 more riders per day would require two additional 25-passenger buses, but for weekends only. During the week, the existing five buses could accommodate an additional 112 passengers daily. The real solution is not to buy more buses, but rather to increase sales (by increasing fares and number of riders), and/or to reduce the cost per operating mile. (At least part of this answer will come from the summer shuttle which the park will operate.) In addition to breaking even, additional monies must be generated to allow the operator to make a profit.

Pro forma 2, which has an $8 average fare, would require 1,010 additional riders for the season or six additional passengers per day to reach the break-even point. The question to be answered here is whether visitors will pay fares of $10 for adults and $5 for children and seniors. In order for the operator to make a reasonable profit, an additional 5,000 riders are needed.

III. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The park does have an attraction at the Hensley Settlement that the majority of visitors will never enjoy due to a lack of transportation.

Pro formas for a shuttle service to the Settlement show a loss before interest and depreciation. Pro forma 1 lists what appears to be an insurmountable loss requiring 14,700 additional riders to reach a break-even point. Pro forma 2, which was based on higher fares, appears less difficult to achieve the break-even point, needing only 1,010 additional riders; however, visitors may shy away because the fares may be too high. Profit still needs to be addressed.

Shuttle vans to the Pinnacle would have to be less than 20 feet in length because of sharp switchbacks. Vans this size would not be practical for use to the Hensley Settlement.

RECOMMENDATIONS

The park has leased a van for three months starting in June to carry visitors to the Settlement. A fee will be charged making the results for this test period very valuable. Considering the apparent infeasibility of the shuttle operation, based on the assumptions used in the pro formas, this study should not be finalized until data from the test period is analyzed. This study is thus being issued as a preliminary examination of the proposed shuttle system.

All facets of the test runs should be recorded. This would include all labor by category and hours, fuel consumed, repairs and maintenance, insurance, and of great importance, turnaways. This information should be analyzed and applied to the pro formas in this report to further determine the feasibility of the proposed shuttle.

When the final analysis of the proposed shuttle study is prepared, the parking study being conducted by the Eastern Team should be considered to determine the effect of these proposals on shuttle service to the Pinnacle and the Settlement.

Further consideration of a shuttle to the Pinnacle should be deferred pending the results of the parking study.

APPENDIX I

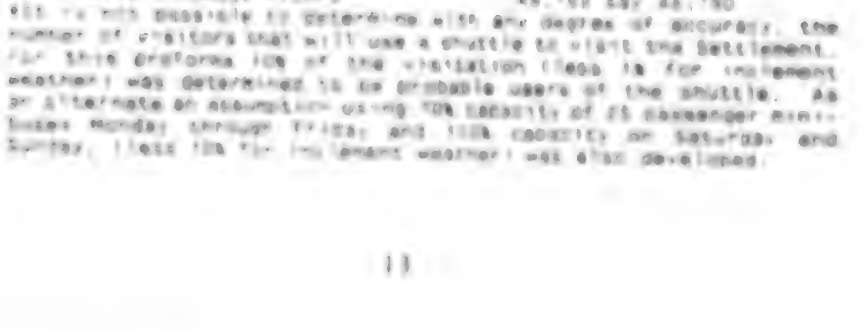
[illegible]

[illegible] NATIONAL DIESEL LINE
[illegible] FOOTNOTES SEE FOOTNOTES NOTES ATTACHED

[illegible] FOOTNOTE #1		FOOTNOTE #2
SALES (LEASES)		
Active	$219,333	$292,740
[illegible]	5,615	14,787
SERVICE LETTERS	44,389	60,000
TOTAL SALES	269,337	367,527
COST OF OPERATIONS	198,[illegible]	198,411
GROSS PROFIT		
OPERATING INCOME		
AND TAXES	(92,21[illegible]	(90,000)
DEPRECIATION	21,219	21,250
COST OF OPERATION PER MILE = $4.[illegible]		

Cost of operation figures include fuel, wages, insurance and repairs and maintenance. Operation costs do not include interest and depreciation.
Operational costs were supplied by the [illegible] Transportation Branch

ADDITIONAL FUNDS NEEDED		
TO RECEIVERS	14,7[illegible]	(,010)



APPENDIX 3

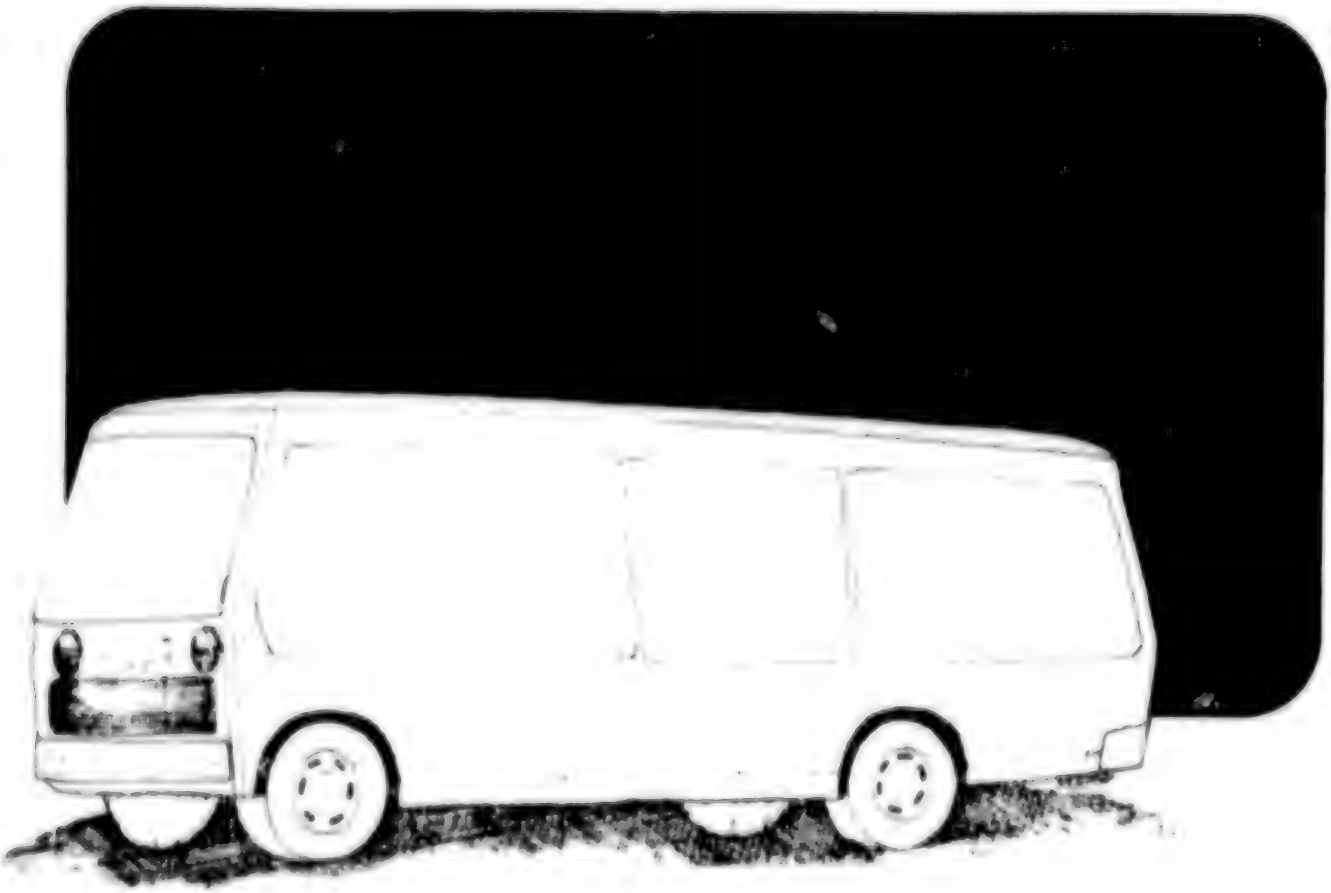
SMALL BOY SPECIFICATIONS

SMALL HEAVY DUTY BUSES

Manufacturer	Model	Seating Capacity	GVW (lbs.)	Empty Weight (lbs.)	Engine Type/ Location	Displacement/ Horsepower	ADJV MPG	LOA (ft.)	Suspension Type	Brake Type	Est. Life Yrs./Miles	Price $	Alt. $	Lift $
Blue Bird Body Co	City Bird CBFF28DA	25	30,400	20,040	Diesel/rear	318 CID 210 HP	5.3 6.7	28	Air	Air	12-15 yrs	100,000	10,000	12,000
	City Bird CBFF28D4	31	36,400	22,000	Diesel/rear	470 CID 210 HP	5.3 6.7	33	Air	Air	12-15 yrs	110,000	10,000	12,000
Bus Industries of America/ Ontario Bus Industries	Orion II (Prototype)	18 28	15,250 19,500	N/A	Diesel/front (FWD)	198 HP 8.2L (500 CID) 180 HP	N/A	27 28	Air	Air	N/A	75,000 80,000	N/A	Ramp incl. (See Note)
	Orion 30 (# 502)	31	28,400	19,250	Diesel/rear	318 CID 210 HP	5.9	30	Air	Air	15-18 yrs 1½ mil. mi.	106,950	10,000	11,500
Carpenter Body Works	CBW 330	2 or 29 1 or 33	34,500	19,500	Diesel/rear	318 CID 210 HP	N/A	30	Air	Air	N/A	105,950	N/A	N/A
Chance Coach, Inc	RT 50	25	27,000	19,130 (15,830 w/o/lift)	Diesel/front	636 CID 175 HP	7	28	Air	Air	750,000	110,000	Incl.	10,000
Colby Corporation	Phantom 30	33	21,500	N/A	Diesel/rear	552 CID 263 HP	4.6	30	Air	Air	1 million	110,000 125,000	5,000	12,000
Navistar USA Corp	AN42B Lo-Lo Bus	24-27	21,000	13,000	Diesel/rear	8.2L (500 CID) 185 HP	5.10	28	Air	Air	500,000	80,000 90,000	Incl.	Option Avail
Setrakian Industries, Inc.	Transmaster	23 27	21,500 23,500	15,500 17,500	Diesel/rear	8.2L (500 CID) 205 HP	7	25 30	Leaf Spring (Air Option)	Air Air	500,000	80,000 90,000	1,000	1,500 (Ramp low floor)
Specialty Vehicle Manufacturing Corp.	Series 2500	25-30	21,000 24,000	N/A	Gas or diesel/ front	Diesel: 8.2 L (500 CID)	N/A	25-28	Leaf Spring (Air Option)	Hydraulic (Air Option)	N/A	68,000 85,000	Incl.	Option Avail
Steyr-Daimler-Puch AG	Steyr City Bus SCB19B	15	9,700	5,600	Diesel/front (FWD)	4 L/112 HP	15	20	Coil Spring front Air rear	Hydraulic disc front drum rear	12-15 yrs @ 30,000 miles/yr	78,000	1,500	Ramp Incl. (See Note)
Thomas Built Buses, Inc.	Transit Liner 31	27	N/A	21,000	Diesel/rear	N/A	N/A	31	Leaf Spring	Air	N/A	N/A	N/A	N/A

Abbreviations: GVW - Gross Vehicle Weight rating
ADJV MPG - Advertised fuel economy in miles per gallon
LOA - Body length overall
FWD - Front Wheel Drive

Indiana Department of Transportation
November 1983



MINIBUS

MINIBUS

Advantages

Small size allows more frequent service than with larger buses

Maneuverable on narrow roads

Variety of seating arrangements available

Special features available for handicapped

Baggage space can be provided

Decorations and special bodies can be provided for rider appeal

Small ridership reduces crowding and loading unloading time at bus stops

Lower cost than larger buses

Good contact between passenger and driver guide

Can be used in alternate services during off peak seasons

Numerous small vehicles can be widely dispersed throughout a park to achieve large group management

Good visibility from bus interior

Disadvantages

Low capacity requires many units if crowds are large, possibly causing traffic problems

Inefficient for long runs

One driver handles 20 or 25 passengers instead of 40 or 50, resulting in high operating cost per passenger

Applications

For internal service on two-lane park roads where crowds are not too large, small buses are ideal

For special services required by small groups of people, small buses can render efficient service

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PHYSICAL DATA

Passenger Capacity	15 to 25 seats
Length	20 to 25 feet
Width	8 feet
Height	9 to 10 feet
Weight (empty)	11,000 pounds
Fuel Tank Capacity	70 gallons

ECONOMIC DATA

Initial Cost	$20,000 to $40,000
Estimated Life	3 to 8 years
Annual Depreciation	$4,500 to $6,000
Operating Cost (except depreciation and interest)	$ 75 to $ 80 per vehicle mile

PERFORMANCE DATA

Average Operating Speed	15 mph to 25 mph
Motive Power	Diesel, Gasoline or Propane
Fuel Consumption (diesel)	6.5 miles per gallon
Loading/Unloading Time	2 minutes
Maximum Grade Negotiable	25 percent
Turning Radius	30 feet

REPRESENTATIVE MANUFACTURERS

Mercedes Benz, Inc.
Montvale, New Jersey

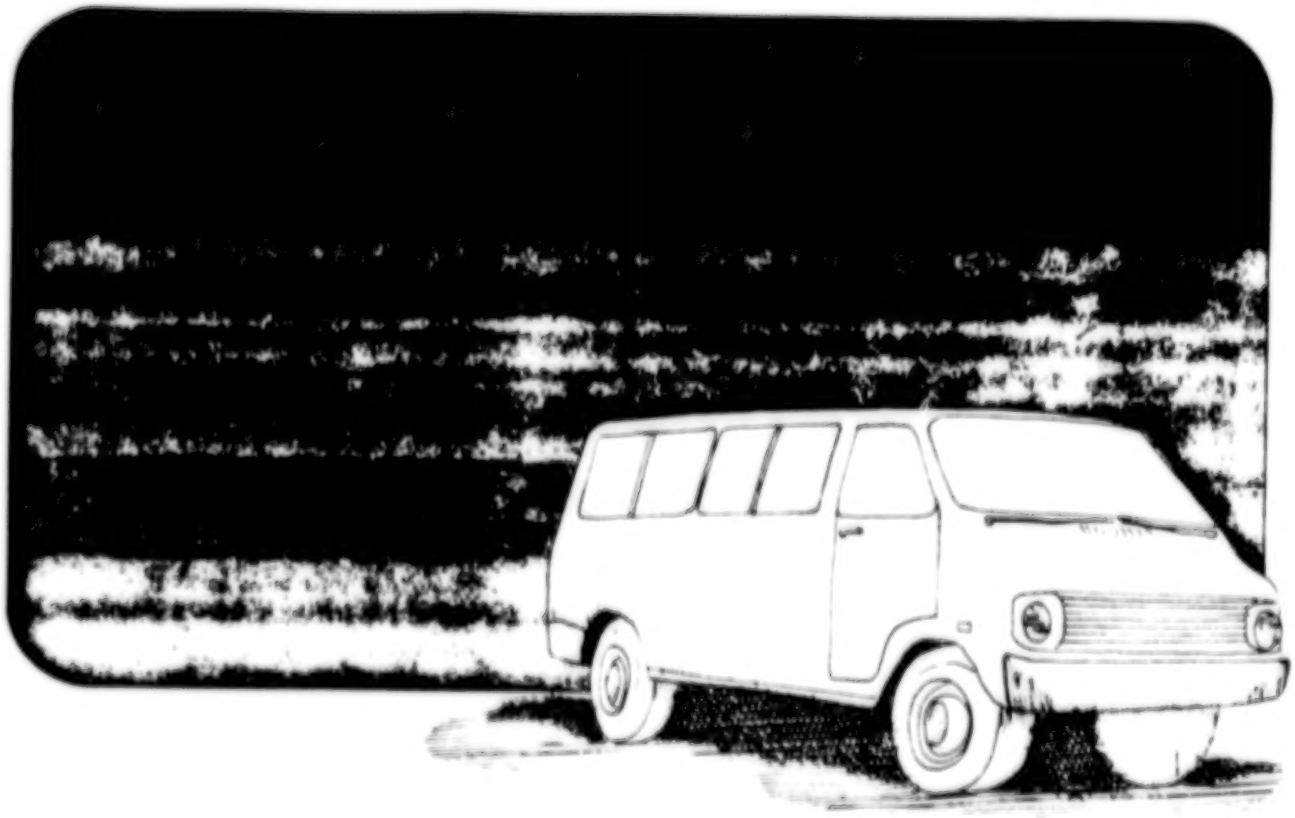
Chance Manufacturing Company, Inc.
Minibus Division
Wichita, Kansas

Fleetwood
Riverside, California

Transcoach Division
Sportscoach Corporation
Chatsworth, California

Twin Coach Highway Products, Inc.
Kent, Ohio

Grumann
Garden City, New York



PASSENGER VAN

The passenger van is a vehicle similar to the automobile in its flexibility of operation, ease of handling and availability. Van vehicles for 8 to 12 passengers can be obtained from commercial auto dealers and vans for up to 15 passengers with raised roof for interior standing headroom can be prepared by numerous vehicle converters. The available options for vans including bucket seats, air conditioning and audio equipment, are as diverse as for private autos. Vehicle entrances in addition to the driver's door may include a hydraulically operated door opposite the driver for passenger step-up, a sliding or hinged doubled door along the rear passenger side and a rear gate entry for quick egress.

Because of their relatively small passenger capacity and ease of entry and egress, passenger vans are ideally suited for jitney transportation service as well as for small group tours. Jitney services can operate along fixed routes, such as a boardwalk or popular hiking trail and can pick up and discharge passengers anywhere along the route. Small passenger vehicles require only infrequent stopping and starting along a jitney route, and minimize the confusion and delay for passengers getting on or off.

PASSENGER VAN

Advantages

Small size allows very frequent service.

Can be used for services with low level demand.

Variety of features available for handicapped, and other options for general passenger comfort.

Availability of sales and servicing practically universal.

Jitney operation easy to understand for occasional park visitors.

Flexible service permits efficient crowd management in parks.

Good potential for alternate use of vehicle during off-peak seasons.

Disadvantages

Small size requires numerous vehicles and drivers. Low passenger productivity of drivers results in high unit costs.

Small size of vans requires so many vehicles during peak periods that congestion will be similar to auto traffic.

Exit from rear seat is difficult.

Applications

Jitney service along fixed routes, signaled by waving for driver to stop.

Small group tours, possibly for remote service where demand is low.

PHYSICAL DATA

Passenger Capacity	8 to 12 seats, enlargement to 15 seats possible
Length	15 to 18 feet
Width	6.5 feet
Height	6.5 feet to 10 feet possible
Weight (empty)	6,000 pounds
Fuel Tank Capacity	21 to 25 gallons

ECONOMIC DATA

Initial Cost	$6,000 to $9,500
Estimated Life	3 to 5 years
Annual Depreciation	$1,700 to $1,800
Operating Cost (except depreciation and interest)	$.75 per vehicle-operating-mile (see sample computation, page 50)

PERFORMANCE DATA

Average Operating Speed	15 to 35 mph
Loading/Unloading Time	1.5 minutes
Motive Power	Gasoline
Fuel Consumption	9 miles per gallon
Maximum Grade Negotiable	25 percent

REPRESENTATIVE MANUFACTURERS

General Motors Corporation
Pontiac, Michigan

Ford Motor Company
Dearborn, Michigan

Dodge Motors Division
Chrysler Motors Corporation
Detroit, Michigan

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